

What is claimed is:

1. A method of synthesizing carbon nanotubes, comprising the steps of:  
2      introducing a catalyst in a reactor;  
3      supplying a reactant gas containing a carbon source gas over the catalyst;  
4      selectively and locally heating the catalyst in the reactor; and  
5      growing carbon nanotubes from the heated catalyst.

1      2. The method of claim 1, wherein the catalyst is formed of a transition  
2      metal such as iron, nickel or cobalt; metal sulfide, metal carbide, metal oxide or  
3      metal salt of the transition metal; or an organic compound containing the transition  
4      metal.

1      3. The method of claim 1, wherein the catalyst is loaded on a support by  
2      an impregnation method, an incipient wetness method or an ion-exchange method  
3      and is supplied into the reactor in a powder state.

1      4. The method of claim 1, wherein the catalyst is loaded on a substrate  
2      by a deposition method, a painting method ~~and~~ a spray method to be supplied into  
3      the reactor.

1      > 5. The method of claim 1, wherein for the catalyst, a metal precursor is  
2      loaded on a substrate or a support and changed into a metal phase through  
3      reduction, calcination, sulfiding or carbonization, and the metal catalyst is supplied  
4      into the reactor.

1      6. The method of claim 1, wherein for the catalyst, metal sulfide obtained  
2      by sulfiding a metal precursor with hydrogen sulfide is used.

1      7. The method of claim 1, wherein the catalyst is supplied into the reactor  
2      in the form of a catalyst precursor in gas phase.

1        8. The method of claim 7, wherein the catalyst precursor is ferrocene or  
2        iron pentacarbonyl.

1        9. The method of claim 1, wherein the carbon source gas contains one  
2        selected from the group consisting of acetylene, methane, propane and benzene.

1        10. The method of claim 1, wherein the reactant gas further comprises  
2        hydrogen gas or inert gas.

1        11. The method of claim 1, wherein the reactant gas further comprises  
2        hydrogen sulfide ( $H_2S$ ) gas.

1        12. The method of claim 1, wherein the local heating of the catalyst is  
2        performed by irradiation of microwaves.

1        13. The method of claim 1, wherein the local heating of the catalyst is  
2        performed by electromagnetic inductive heating.

1        14. The method of claim 1, wherein the local heating of the catalyst is  
2        performed by laser heating.

1        15. The method of claim 1, wherein the local heating of the catalyst is  
2        performed by radio frequency heating.

1        16. An apparatus for synthesizing carbon nanotubes, comprising:  
2        a reactor for receiving a catalyst;  
3        a reactant gas supplier for supplying a carbon source gas into the reactor;  
4        and  
5        a local heater for selectively heating the catalyst received in the reactor.